



CIRCLE

Definition, Parts, Types, Formulas and Properties

A Beginner-Friendly Guide to Understanding Circles in Geometry

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1. Introduction to a Circle

In geometry, a [circle](#) is an important geometric shape. A circle is a round-shaped figure whose points are at the same distance from its center. The concept is used across mathematics and also appears in subjects such as physics and astronomy.

This document covers the definition of a circle, its important parts, types, formulas and basic properties.

2. Circle Definition

A circle is a curved line whose points are equidistant from a fixed center. Common examples that resemble circular shapes include a wheel, coin and compact disc.

3. Parts of a Circle

Part	Meaning
Diameter	Line segment passing through the center and meeting the circle at both sides; it is the longest chord.
Radius	Distance from the center to the circumference; it is half the diameter.
Circumference	Distance around the circle, representing its perimeter.
Center / Origin	The point in the middle of the circle equidistant from all points on the circle.
Tangent	A line that touches the circle at one common point.
Tangency Point	The point where a tangent touches the circle.
Chord	A line segment whose endpoints lie on the circle.
Arc	A part of the circumference; it may be minor or major.
Segment	Region enclosed between an arc and a chord.
Sector	Region enclosed by two radii and the corresponding arc.
Secant	A line that intersects the circle at two points.

4. Types of Circles

Tangent Circles

Circles that touch/intersect at a common point without sharing the same center.

Concentric Circles

Two or more circles with the same center but different radii.

Congruent Circles

Two or more circles with equal radii but different centers.

5. Circle Formulas

Quantity	Formula
Area	$A = \pi r^2$
Diameter	$d = 2r$
Radius	$r = d/2$
Circumference	$C = 2\pi r$

6. Radius and Diameter

The radius extends from the center to the circumference, while the diameter passes through the center and reaches the circumference at both ends. Therefore, the diameter is twice the radius and the radius is half the diameter.

7. Circle Properties

- Circles having equal radii are called congruent circles.
- The diameter is the longest chord of a circle.
- A perpendicular from the center to a chord divides the chord into two equal parts.
- The radius is perpendicular to the tangent at the point where the tangent touches the circle.
- Angles formed by the same arc at the circumference are equal.
- An angle formed by an arc at the center is twice the inscribed angle formed by the same arc.

8. Arc, Segment and Sector

An arc is a portion of the circumference. A minor arc is the smaller portion, while a major arc is the larger portion.

A segment is the region between a chord and its corresponding arc and can be minor or major.

A sector is the region enclosed by two radii and the corresponding arc and can also be minor or major.

9. Tangent and Secant

A tangent touches a circle at one common point, called the point of tangency. A secant intersects the circle at two points.

10. Practical Examples

- Wheels and tires
- Coins
- Compact discs
- Circular plates
- Circular mechanical components

11. Example: Area of a Circle

If the radius is 7 units, use $A = \pi r^2$.

$$A = \pi \times 7^2 = 49\pi \text{ square units}$$

12. Example: Circumference

If the radius is 7 units, use $C = 2\pi r$.

$$C = 2 \times \pi \times 7 = 14\pi \text{ units}$$

13. Key Takeaways

Circle: A round geometric figure whose points are equidistant from its center.

Radius: Distance from the center to the circumference.

Diameter: Twice the radius and the longest chord.

Circumference: The distance around the circle.

Area: Calculated using $A = \pi r^2$.

Important Parts: Include tangent, chord, arc, segment, sector and secant.

Types: Tangent, concentric and congruent circles are discussed in the source article.

14. Conclusion

A circle is one of the most important shapes in geometry. Understanding its center, radius, diameter, circumference, chords, arcs, sectors and tangents provides a strong foundation for learning more advanced geometry concepts.

The fundamental formulas $A = \pi r^2$, $d = 2r$ and $C = 2\pi r$ make it possible to solve many practical problems involving circular measurements.